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Rhodora

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THE NEW ENGLAND BOTANICAL CLUB

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# NUTTALL'S GREAT PLAINS SPECIES OF CIRSIUM: C. UNDULATUM AND C. CANESCENS[1]

GERALD B. OWNBEY

IN the course of his numerous botanical expeditions, Thomas Nuttall discovered several new species of *Cirsium*, two of which were definitely from the Great Plains. These were *Cirsium undulatum* (Nutt.) Spreng. and *C. canescens* Nutt. The type specimen of each of these species is poor, and in the case of *C. canescens* has been largely inaccessible to American botanists.

Asa Gray in his synopsis of North American thistles, published in 1874, gave specific rank to only the earliest proposed of the two species, *Cnicus undulatus*, in which he recognized four varieties, namely, var. *canescens* (Nutt.) Gray, var. *megacephalus* Gray, var. *ochrocentrus* Gray, and var. *Grahami* Gray. The last two varieties will not be considered here.

Gray's disposition of Nuttall's proposed species has not proved satisfactory, and has resulted in further nomenclatorial complexities. The following discussion represents an attempt to resolve some of these difficulties. After reviewing the evidence, the present writer has found it necessary to apply the name *Cirsium undulatum* (Nutt.) Spreng. to Gray's var. *megacephalus* exclusively. *Cirsium canescens* Nutt. appears to him to represent the same entity as *C. plattensis* (Rydb.) Cockerell, and as such is specifically distinct from *C. undulatum*. Evidence supporting this disposition of Nuttall's names is presented under the species concerned.

[1] This investigation was supported in part by a grant from the Graduate School, University of Minnesota. Costs of the engravings for the plates were met from the Hayden bequest to the Dept. of Botany, U. of M. Part of the field work was done while in residence at the U. of M. Forestry and Biological Station, Itasca State Park, Minnesota.

In the preparation of this paper I am indebted to Dr. F. W. Pennell and Dr. F. G. Meyer for supplying me with photographs of types. Curators of the New York Botanical Garden Herbarium, the Gray Herbarium, the Rocky Mountain Herbarium, the Iowa State College Herbarium, and the University of Nebraska Herbarium have been of assistance in supplying additional authentic specimens. I wish to extend my thanks to these botanists.

**Cirsium undulatum** (Nutt.) Spreng., Syst. Veg. 3: 374. 1826.

*Carduus undulatus* Nutt., Gen. **2**: 130. 1818. *Cirsium undulatum* Torrey and Gray, Fl. N. Am. **2**: 456. 1843, in part; DC., Prodr. Syst. Nat. **6**: 651. 1838; Rydberg, Fl. Pr. and Plains 882. 1932; W. C. Stevens, Kans. Wild Fl. 426. 1948. Fernald, Gray's Man., ed. 8. 1541. 1950, in part. *Cnicus undulatus* Gray, in Proc. Am. Acad. **10**: 42. 1874, in part; Syn. Fl. N. Am. **1** (2): 403. 1884, in part. *Cnicus undulatus* var. *megacephalus* Gray, l. c. *Carduus undulatus* var. *megacephalus* Porter, in Mem. Torr. Bot. Club **5**: 345. 1894. *Carduus megacephalus* Smythe, in Trans. Kansas Acad. Sci. **16**: 160. 1899; Nutt. ex Daniels, in Univ. Mo. Stud. **2**: 402. 1911 (Daniels, Fl. Boulder, Colo., 254. 1911). *Cirsium undulatum* var. *megacephalum* Fernald, in Rhodora **10**: 94. 1908; O. A. Stevens, N. Dak. Pl. 293. 1950; Fernald, Gray's Man., ed. 8. 1541. 1950. *Cirsium megacephalum* Cockerell ex Daniels, l. c.; Rydberg, l. c.

Perennial from root sprouts, but not strongly so; stems erect, mostly 3–8 dm. tall, simple or sparingly branched above, densely white-tomentose throughout; juvenile leaves elliptical, nearly regular to irregularly toothed at the margins, the later ones becoming successively more deeply cut, each lobe terminated by a stoutish spine and with a few weaker marginal ones; lower cauline leaves usually with a long, winged petiole, the blade often deeply pinnatifid; *middle and upper cauline leaves sessile, the blade broadest at the base, clasping the stem,* irregularly and usually shallowly *cut at the margin into deltoid lobes,* each lobe terminated by a stout spine which is an extension of the conspicuous midrib of the lobe; *upper and lower surfaces of all the leaves densely tomentose,* the upper surface sometimes less so, becoming green in age; inflorescence a single head terminating each main branch; involucre usually large, about 3.0 (2–4) cm. in diameter and about 3.5 (3–4) cm. high; outer involucral bracts narrowly ovate, arachnose, especially at the margins, with a broad dorsal, medial, glandular ridge and a usually stout apical spine which is about 2.5–4.5 mm. long; innermost involucral bracts much elongated, the flat tip linear or lance-linear, not at all expanded marginally, sometimes hispid at the edge; flowers purple, rarely white; achenes straw-colored, sometimes minutely streaked with brown, 6–7 mm. long and 2.5–3 mm. broad at widest point.

Distribution: plains and foothills, western North Dakota, South Dakota, Nebraska, Oklahoma and Texas westward at low elevations to the Pacific coast states, but commonest in the Great Plains. Reports of this species east of the Great Plains doubtless are a result either of chance introductions or misidentifications.

The type of *Cirsium undulatum* is on deposit at the Philadelphia Academy. A photograph of the type is reproduced in

Plate 1182. It consists of a single basal leaf bearing Nuttall's original tab. Another label added by A. Gray reads "The authentic original representative (and all of it) of *Cnicus undulatus.*" It appears that this statement is probably correct since Dr. F. G. Meyer, in 1950, found no more type material in Nuttall's herbarium. A specimen collected by Culbertson in 1850 mounted with the type is also *C. undulatum.*

An examination of the type provides sufficient evidence that it represents the taxon known as *Cirsium undulatum* (Nutt.) Spreng. var. *megacephalum* (Gray) Fernald or *Cirsium megacephalum* (Gray) Cockerell. This combination of shape and pubescence of the basal leaves is found in no other species of *Cirsium* of this region.

The habitat of *C. undulatum* is given in the original description as "On the calcareous islands of lake Huron, and on the plains of Upper Louisiana." Reference to its occurrence on the islands of Lake Huron is in error, and is possibly resultant from confusion with some other species of *Cirsium* in literature. Nor to the best of my knowledge does the species occur in what is now Louisiana though this is certainly within the limits of possibility. It is, of course, abundant in what was formerly the Louisiana Territory.

*C. undulatum* is recognizable even in seedling stages by its broad, entire or toothed juvenile leaves and reproduction by root shoots. At maturity the species is marked by its stout habit, large cauline leaves, the middle and upper ones sessile and distinctly clasping the stem, its very large involucres, and its overall densely tomentose nature. It is sometimes confused with *C. flodmanii* in herbaria, but this is principally a result of placing too much reliance on size of involucres. The leaves provide more reliable characters. Although the species sometimes grows with *C. flodmanii,* it, on the whole, occupies drier situations. The species overlap only at the extremes of their tolerance ranges, at the more moist end for *C. undulatum,* and at the drier end for *C. flodmanii.* I have seen no evidence of natural hybridization between them.

A considerable amount of geographical variation exists in this species. A number of variants have been given varietal or specific names. It is not within the scope of the present paper

to discuss more than the midwestern aspect of the species to which Nuttall's type belongs, but a further study of its broader aspects in contemplated.

**Cirsium canescens** Nutt., in Trans. Am. Phil. Soc. 7: 420. 1841.

*Cnicus undulatus* var. *canescens* Gray, in Proc. Am. Acad. Arts and Sci. **10**: 42. 1874, in part; Syn. Fl. N. Am. **1** (2): 403. 1884, in part. *Carduus plattensis* Rydb., in Contr. U. S. Nat. Herb. **3**: 167, pl. 2. 1895; Britton and Brown, Ill. Fl. n. U. S. and Canada, **3**: 487. 1898. *Carduus plattensis* var. *spinosior* Rydb., l. c. *Carduus Nebraskensis* Britton, l. c. *Cnicus plattensis* Pammel, in Proc. Iowa Acad. Sci. **8**: Plate XXX. 1901. *Cnicus plattensis* var. *spinosior* Pammel, l. c. *Cirsium plattense* Cockerell ex Daniels, in Univ. Mo. Stud. Sci. **2**: 402. 1911 (Daniels, Fl. Boulder, Colorado, 254. 1911); Fernald ex Robinson, in Rhodora **13**: 240. 1911; Britton, Britton and Brown, Ill. Fl. n. U. S. and Canada, ed. 2, **3**: 551. 1913; Petrak, in Beih. Bot. Centralbl. 35 (2): 430. 1917; Rydberg, Fl. Rocky Mts. 1012. 1917; Fl. Pr. and Plains, 881. 1932. *Cirsium nebraskense* Britton, l. c. 552; Rydberg, Fl. Rocky Mts. 1012. 1917; Fl. Pr. and Pl. 881. 1932. Not *C. nebraskense* Lunell. *Cirsium Lettermanii* Petrak, l. c. 432, nomen nudum in syn.

Biennial from a deep tap root; stems usually 4–8 dm. tall, simple or branched upward, tomentose throughout; first basal leaves narrow, tapering to both ends, entire or undulate-margined, later ones successively more and more deeply lobed, the lobes oblong, all weakly spinose marginally; *cauline leaves decurrent on the stem, the wing usually provided with long, stout spines; blades of the lower cauline leaves mostly deeply pinnatifid into narrowly oblong segments which are 3–6 times longer than broad*, each lobe tipped with a weak spine and armed with still weaker spines marginally; middle cauline leaves less deeply pinnatifid than the lower, the segments ovate or deltoid; *uppermost cauline leaves linear or oblong-linear*, with undulate or dentate weakly spinose margins; lower surfaces of the leaves uniformly white tomentose; upper surfaces of the leaves more sparsely tomentose, usually greener than the lower; inflorescence of a few large, terminal heads at first, and occasionally few to numerous other nearly sessile heads on axillary shoots produced later in the season; first involucres large, usually 2.5–4 cm. broad, 3–4 cm. high, the later ones much smaller; involucral bracts sparingly arachnose to glabrate, minutely puberulent, the outermost ones lanceolate, having a distinct, glandular, medial ridge, and tipped by more or less well developed spines which usually are 2.5–6 mm. long; innermost involucral bracts somewhat elongated, the apical processes spreading, lanceolate, more or less expanded laterally, often erose-margined, translucent; flowers ochroleucous, very rarely pale or dark lavender; achenes straw-colored, often minutely streaked with brown, 6–7 mm. long and about 2.5 mm. broad at point of greatest width.

Distribution: Occurring on the semi-arid hills, plains and roadways of central and western Nebraska, northeastern Colorado, eastern Wyoming and southwestern South Dakota; possibly also in northern Kansas and southeastern Montana; often in sandy soil.

Photographs of Nuttall's type, collected on the "Arid plains of the upper Platte" and now on deposit at the British Museum are

PLATE 1182

*Cirsium undulatum* (Nutt.) Spreng. Fig. 1, Type, consisting of a single basal leaf. Fig. 2, a Culbertson specimen mounted with the type, consisting of one young plant. Fig. 3, an enlargement of Fig. 2, showing nature of pubescence on stem and foliage.

PLATE 1183

*Cirsium canescens* Nutt. Fig. 1, Type, consisting of two depauperate plants broken off at ground level. Fig. 2, enlargement of stem showing decurrent leaf bases. Fig. 3, head, showing nature of involucral bracts.

reproduced in Plate 1183.[2] It consists of two depauperate plants broken off at the surface of the ground. A comparison of the type photographs of *C. canescens* Nutt. with the type of *C. plattense* (Rydb.) Cockerell provides substantial evidence that both belong to the same species. Rydberg's species was described from several Nebraska specimens, the type designated being *Rydberg 1356* from "Near Plummer Ford, Dismal River, Thomas County, on sandhills," July 5, 1893, and now deposited in the herbarium of the New York Botanical Garden. The two proposed species share the following features: the pinnatifid basal and lower cauline leaves, the lobes usually narrowly oblong in outline (more narrowly oblong in the type of *C. plattensis*); leaves progressively less pinnatifid up the stem, the uppermost lanceolate to linear, dentate or undulate margined; bases of the cauline leaves strongly decurrent; involucral spines comparatively short. This seems to the writer sufficiently strong evidence to warrant combining of the two proposed species. Further, field studies to date have provided no evidence that there is more than one species in which these features are combined in the region in question.

Nuttall described *C. canescens* as having "Florets pale rose,—" This could have been true although the predominating color of the corollas in this species is ochroleucous. The corollas often are tinted with lavender in the western part of the species range, and occasionally are even deep lavender. I can explain Nuttall's statement "The roots creeping as in *C. arvense*" only by hypothesizing that in this respect it was confused with *C. flodmanii*. The type specimen offers no support to Nuttall's statement.

[2] Nuttall crossed the continent with a party led by Nathaniel J. Wyeth on Wyeth's second expedition to Oregon. The following information taken from Wyeth's Journals, published as Vol. I, Parts 3 to 6 of "Sources of the History of Oregon," University of Oregon Press, 1899, is pertinent. The party traveled along and near the North Platte River from near its junction with the South Platte westward through Nebraska, crossing into what is now Wyoming on May 31, 1834 and leaving the Platte at the Red Buttes, Natrona Co., on June 8. Nuttall's "Arid plains of the upper Platte" probably, therefore, are correctly located in eastern Wyoming somewhere within a few miles of the river. One can safely assume that the latest possible date for collecting the type was June 8. The elevation of the plains in this region increases from about 4,000 feet at the state line to just over 5,000 feet at Casper, Wyoming, which is only a few miles northeast of the Buttes. In view of the early date, elevation and aridity of the region, it is not surprising that Nuttall brought back very immature, dwarfed specimens. I have collected this species in bud, flower and early fruit at Douglas, Wyoming, on July 21, or approximately six weeks later in the season. The plants were of normal size.

*C. canescens* Nutt. was combined with *C. brevifolium* Nutt.[3] by Gray and reduced to *Cnicus undulatus* var. *canescens*. The name was then applied to another species which was at that date still unrecognized as distinct from *Cirsium undulatum*, namely, *C. flodmanii* (Rydb.) Arthur. Later authors who took up the name either as a variety or species usually followed Gray in applying it to *C. flodmanii*. That this practice was incorrect is confirmed by inspection of the types. This usage, however, necessitated the proposal of another name for the predominantly ochroleucous flowered species of the central plains. The first such name proposed was *Carduus plattensis* Rydb. discussed above.

*Carduus plattensis* var. *spinosior* Rydb. appears to me to be no more than the most spinescent extreme of *C. canescens* Nutt. and hardly deserving of nomenclatorial recognition. Rydberg designated no type for the variety but cited several Nebraska collections, namely, *Fendler 73* from near Ft. Kearney, *Hayden s. n.* from the sand hills of the upper Platte, both at the Gray Herbarium; *Smith and Pound 64* (in part) from Boxbutte Co., and *Clements 2964* from Paddock, Holt Co,. the latter two said by Rydberg to be at the University of Nebraska. Of the cited specimens I have seen only *Smith and Pound 64* sent by both the New York Botanical Garden and the University of Nebraska. The New York specimen is marked Type, and I see no reason for denying it this status. One of the two stems is very spinescent as is also part of the Nebraska material. This number was, however, cited as both species and variety by Rydberg.

The type of *Carduus Nebraskensis* Britton, *Rydberg 110*, from "Scotts Bluff, Nebraska, July 24, 1891," is deposited at the New York Botanical Garden (Columbia College Herbarium). It is fragmentary, consisting of the upper portion of one stem. However, the linear uppermost leaves and decurrent leaf bases are readily discernible, and the combination of these two characters is sufficient to establish its identity with *C. canescens* Nutt. The basal leaves which are equally diagnostic were not preserved.

[3] I am in doubt as to the identity of *C. brevifolium* Nutt., but it is certainly not conspecific with *C. canescens* Nutt, or *C. undulatum* (Nutt.) Spreng. I thought for some time that it possibly was conspecific with *Cirsium flodmanii* (Rydb.) Arthur. Dr. Arthur Cronquist who has recently viewed the type of *C. brevifolium* at the British Museum is, however, of the opinion that it is referable to the Pacific northwest *C. palousense* Piper. There is considerable evidence supporting this view.

Curiously, in the original description of *C. plattense*, Rydberg cited his July 24, 1891 collection from Scotts Bluff, Nebraska. Petrak in his study of *Cirsium* in North America placed *Carduus nebraskensis* Britton in synonymy under *C. canescens*, but then misapplied this name to what is at present known as *C. flodmanii*.—University of Minnesota, Minneapolis.

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## SOME NEW ENTITIES IN THE FLORA OF THE BROOKS RANGE REGION, ALASKA

Contributions to the Flora of Alaska, No. 2

Louis H. Jordal[1]

In the course of two seasons' botanical explorations in the Brooks Range region of Alaska a number of plants were discovered which could not be fitted into any known systematic categories and which after careful review of literature and collections must be regarded as being new to science.[2]

In the report on the Brooks Range investigations which I prepared as a dissertation to the Graduate School of the University of Michigan under the title (1951) "A Floristic and Phytogeographic Survey of the Southern Slopes of the Brooks Range, Alaska" these new entities are described and discussed at some length. But because of inevitable delays associated with the publication of such a lengthy account it seems expedient to publish here briefly the formal diagnoses of these new entities.

Altogether five undescribed species were found in the flora of the Brooks Range region. Two of these are members of the genus *Oxytropis* which have been recently proposed as new by Mr. A. E. Porsild in Can. Field Nat. 64 (2). A third species is a *Poa* related to *Poa abbreviata* R. Br. This taxon, as yet undescribed, is in the hands of Mr. J. R. Swallen of the Smithsonian Institution.

The remaining species and forms are described and briefly discussed as follows:

[1] We regret to report that Louis H. Jordal was killed in an airplane crash in December, 1951. Eds.

[2] The author is indebted to the Arctic Institute of North America for research support which made these botanical activities possible and also to the Director of the Botanical Gardens, Univ. of Michigan, for aid and support.

**Festuca altaica** Trin., f. **pallida** f. nov. Paniculae angustiores quam in forma speciei typica; spiculae pallide flavescenti-virides; lemmata dorsaliter paene glabra. Specimen typicum in Herbario, Univ. Michiganensis conservatum, *Jordal 1862* prope "Wiseman" in montibus "Brooks Range," Alaskanis, denominatis.

No. *1862* has conspicuously pale yellowish-green spikelets with nearly glabrous lemmas. These plants are shorter (up to 45 cm. tall) than the typical form of the species and the inflorescences are less ample. This conspicuous form appears not to have been recognized before.

**Festuca altaica** Trin., f. **vivipara** f. nov. Plantae robustae; floribus viviparis. Specimen typicum in Herbario, Univ. Michiganensis conservatum, *Jordal 2471* ad locum "Wild Lake" in montibus "Brooks Range," Alaskanis, denominatis.

This collection is comprised of a tall (90 cm.) viviparous form of very robust appearance with broader leaves and coarser stems etc., than the typical form of the species. Although it appears to be only of sporadic occurrence it deserves a name.

**Braya Bartlettiana** sp. nov. Perennis, gracilis, 3–10 cm. alta; caudice plus minusve elongato plerumque multicipiti sed interdum simplici; ramis caudicis folia dense aggregata et scapum singulum ferentibus; folia 5–20, basalia, lineari-lanceolata, 5–25 mm. longa, minus quam 2 mm. lata, apice acuta vel obtiuscula, ad basim versus late et pellucide marginata usque ad insertionem semi-amplexicaulem latam, marginibus subintegris vel denticulis duobus (raro 4) praeditis, sparse ciliatis, pilis vel denticuliformibus vel bifurcatis, ad basem marginibus hyalinis longe ciliatis pilis simplicibus, ad superficiem utrinque glabra, plus minusve purpurea, praecipue versus basem et secus costam; nervis, costa conspicua excepta, invisibilibus; caules 1, 2 vel 3, sine foliis supra partem infimam, erecta ca. 10 cm. alti, graciles, ca. 0.5–0.75 mm. crassi, sparse puberuli, pilis subappressis, inaequaliter bifurcatis, plus minusve (praecipus deorsum) purpureitinctus; inflorescentia vel simplex, racemosa, vel saepe ramo uno unifloro unibracteato distanter infra floram infimam praedita (ramo 3–25 mm. longo, flore graciliter pedicellato; bractea ca. 7 mm. longa vel minus, textura foliis simili); floribus superioribus aggregatis, ascendentibus in pedicellis brevibus minus quam 3 mm. longis, inferioribus gradatim distantioribus, infimis saepe in pedicellis 10 mm. longis gracillimis; flores 3–3.5 mm. longi; sepalis oblongis, subcanaliculatis, apice obtuse cucullatis, 1.5–2.5 mm. longis, 0.8–0.9 mm. latis, 3-nervis, anguste hyaline marginatis, valde purpureis, glabris; petalis parvis, 1.8–3.5 mm. longis, unguiculatis, unguis longitudine triplo breviore quam limbo, usque ad sesquipliciter longiore, ungui anguste ligulato, sine constrictione, sursum gradatim expanso, limbo abrupte expanso, late ovato, emarginato, glabro, pallidiuscule purpureo; stamina curvata, quam sepala paullo breviora vel paullulo longiora; filamentis anguste ligulatis; antheris basi cordatis, late ovatis, 0.4–0.5 mm. longis; siliqua quam 7 mm. brevior, stylo includente, ca. 1.4 mm. lata infra basem rotundatam vel cuneatam, sursum ad stylum attenuata; valvis obscure 1-

nerviis, pallide vel intense purpureis, glabris; septo hyalino, albo, enervio, persistenti, completo; semina bifariam ordinata in ambobus lateribus, ovulis 3–5 per singulam lineam; stylo demum ca. 1 mm. longo, ex medio constricto usque ad stigma gradatim incrassato; stigma capitato ca. 0.5 mm. lato, obscure bifido.

In "tundra" declivitatibus muscosis montium calcareorum, alt. 3500 ped., supra flumen "Bettles River" in montibus "Brooks Range," Alaskanis, July 13, 1949, denominatum. Specimen typicum in Herbario, Univ. Michiganensis, *Jordal 2291*, conservatum.

I must agree with Mr. A. E. Porsild (in correspondence) that the species here proposed "comes dangerously close to *Braya americana* (Hook.) Fern." It is, however, set apart from that species by the nerveless septum. This may be a minor feature but judging from the characters that have been previously used in separating species within the very critical genuus *Eraya* it is valid enough.

Recently E. C. Abbe in Rhodora **50**: 1–15 (1948) has published on the members of this genus in boreal eastern America. He concludes that the specimens from Alberta and Newfoundland which Fernald in Rhodora **28**: 203–204 (1926) referred to *B. americana* (Hook.) Fern. are distinct within their respective areas and that the Newfoundland material must be considered as belonging to a separate species which he establishes as *B. Fernaldii* Abbe. This species is characterized by having lance-subulate siliques, the seeds crowded into one row, valves hirtellous and petals uniformly lilac to pink, fading to white. It is clear from my description that in none of these features does it agree with my material.

The question now remains whether the proposed new species is identical with *B. alpina* Sternb. & Hoppe var. *americana* Hook., to which Fernald (op. cit.) gives specific status and which Hooker in Flor. Bor. Am. I, p. 65 diagnoses as follows: "stylo longiusculo gracili," adding further in his annotations (loc. cit.) that Drummond's material from the Rocky Mountains between lat. 52–57 "differ in no respect from the European plant in my possession from the Carinthian Alps, except in the greater length of the style, which, indeed, is very striking."

Drummond's material had not been seen by Fernald when he gave the var. *americana* Hook. specific status. I have not seen it either, but my material differs from *B. americana* according to Fernald's expanded diagnosis in having completely glabrous

valves and in the fact that the septum only has the faintest trace of a nerve toward the very base and is not "manifeste uninervo," in agreement with the expression which applies to the latter species.

*B. americana, B. Fernaldii, B. alpina, B. aenea, B. Henryae* and *B. Eartlettiana* are all very closely related and considered together phytogeographically they form a logical Arctic-Montane group of vicarious entities in which the components may perhaps be only varietally related to *Eraya alpina* Sternb. & Hoppe. *Braya Eartlettiana*, which is named in honor of Professor H. H. Bartlett, Director of the Botanical Gardens at the Univ. of Michigan, seems to be the particular type which survived in the unglaciated mountain regions of northern Alaska.

**Empetrum nigrum** L., var. **hermaphroditum** (Lange) Soerensen, f. **ciliatum** f. nov. A forma typica foliis margine valde villoso-ciliato differt. Specimen typicum in Herbario Inst. Smithson. "U. S. National Herbarium," Washington, D. C. conservatum, *Jordal 3742* prope "Old John Lake" in montibus "Brooks Range," Alaskanis, denominatis.

This curious form with strongly villous-ciliate leaves was discovered at Old John Lake. It is undoubtedly only a sporadic occurrence but deserves formal recognition.

**Gentiana glauca** Pall., f. **chlorantha** f. nov. Corolla 15–18 mm. longa, omnino pallide flavescenti-viridis. Specimen typicum in Herbario, Univ. Michiganensis conservatum, Jordal no. *2415* prope "Wiseman" in montibus "Brooks Range," Alaskanis, denominatis.

This is a curious color form in which the corolla is greenish-yellow instead of greenish-blue. It occurs occasionally in the populations of the species within our area.

**Phlox alaskensis** sp. nov. Planta perennis, adpressa-caespitosa; folia anguste oblanceolata, vix plus quam 1 cm. longa et 2 mm. lata (mediana 7 × 1.5 mm.), apice valde apiculata, 1-nervia, nervo sub apice evanescenti, glabrata vel utrinque parce glanduloso-pubescentia etiamque valde villoso-ciliata, pilis aliis longis, albis, multiseptatis, aliis brevioribus glanduloso-capitatis; flores in apice ramulorum solitarii, sessiles vel breviter pedicellati, pedicellis valde pubescentibus pilis albis vel flavis, glanduloso-capitatis; calyx anguste conicus, tubo ca. 4 mm. longo, pubescenti pilis eis foliorum similibus, conspicue 5-nervato, lobis linearibus, usque ad 5 mm. longis, viridibus, similiter pubescentibus, adscendentibus, sinulis acutis; corolla pallida caerulea vel incarnato-caerulea, tubo ca. 10 mm. longo, glabro, limbo vix 2 cm. lato, lobis obovatis, usque ad 9 mm. longis et 6 mm. latis, apice rotundatis; stylus ca. 5 mm. longus; antherae flavae, ovales ca. 1 mm. longae; capsulae ca. 4 mm. longae, 3 mm. latae, valvulis venulo mediano praeditis, stramineis, coriaceis,

minute reticulato-foveolatis; semina in loculo singulo, ca. 1 mm. longa, testa atrobrunnea.

Specimen typicum in Herbario, Univ. Michiganensis conservatum, Jordal no. *2198* prope "Wiseman" in montibus "Brooks Range," Alaskanis, denominatis.

This species is closely related to *P. variabilis* Brand from which it differs, *inter alia*, in its strongly glandular foliage, stems and calyces. From *P. caespitosa* Nutt. it differs chiefly in its shorter, shortly exerted or included corolla tubes. From *P. Richardsonii* Hook. it differs mainly in its broader leaves and shorter corolla tubes and from *P. sibirica* L. conspicuously in its smaller size, much more prostrate habit and one-seeded locules.

The caespitose Phloxes in Alaska form a very complicated group of closely related plants. The plants here described as a new species, *P. alaskensis*, appear to have been referred to *P. sibirica* by most workers. Hultén recognizes only two species of *Phlox* in his Flora of Alaska and Yukon and according to his treatment my material would be referred to *P. sibirica*. His treatment is extremely conservative, however, and his concept of *P. sibirica* unduly broad. If Brand's treatment of the genus *Phlox* in Das Pflanzenreich has any authority then it is obvious that the plants we are here discussing cannot even be assigned to the subgenus *Macrophlox* where *P. sibirica* L. belongs. The relatively small size of the seeds of my material and the constantly one-ovuled locules would necessitate placing it in the subgenus *Microphlox* sect. *Chortobolon*.

**Erigeron alaskanus** Cronq., f. **albiflorus** f. nov. A forma typica differt ligulis albis.

Albino forms, differing only in having white rather than blue ligules, occur sporadically within the populations of this endemic species. They are sufficiently conspicuous to deserve some formal recognition.—Botanical Gardens, University of Michigan.

# COCHLEARIA OFFICINALIS ARCTICA IN THE VICINITY OF POINT BARROW, ALASKA

John H. Thomas

*Cochlearia officinalis* ssp. *arctica* (Schlecht.) Hultén is generally considered to be a strand and coastal marsh plant. In the vicinity of Point Barrow it shows a wide range of habitats. The primary factor in its local distribution appears to be the disturbance of the vegetation cover either by erosion or by human activity.

*Cochlearia* grows along the Arctic Coast and along the banks of brackish lakes and lagoons above the high water mark and behind the coarst pebbly beach in sandy or muddy areas. No localities were observed where it grew subject to submersion at high tide or during a storm as does *C. sessifolia* Rollins (Rollins 1941, p. 182) on Kodiak Island. It is commonly associated with *Arenaria peploides* L., *Mertensia maritima* (L.) S. F. Gray, *Phippsia algida* (Soland.) R. Br., *Puccinellia paupercula* (Holm) Fern. & Weath., *Sagina intermedia* Fenzl., *Saxifraga rivularis* L., and *Stellaria humifusa* Rottb. Less frequently *Elymus mollis* Trin., *Papaver radicatum* Rottb., and *Potentilla emarginata* Pursh are found growing with it. The strand association forms a sparse vegetation cover allowing *Cochlearia* to assume a prostrate caespitose rosette-like form, often to 15 cm. in diameter. Young seedlings are often observed which have germinated beneath the mature plants.

There are two types of topography immediately behind the ocean beach: 1, gently sloping tundra, and 2, steep bluffs and cliffs some of which are 50 feet high. On the first type, the tundra and strand meet and gradually intergrade. *Cochlearia* is found in decreasing regularity as one goes back from the beach. On the tundra, characterized by *Cassiope tetragona* (L.) D. Don, *Dryas integrifolia* Vahl., *Dupontia fisheri* R. Br., *Eriophorum* spp., *Luzula* spp., *Poa arctica* R. Br., *Petasites frigidus* (L.) Fries, *Potentilla emarginata* Pursh, *Salix* spp., and *Vaccinium vitis-idaea* ssp. *minus* (Lodd.) Hult., *Cochlearia* is almost always lacking. On steep coastal bluffs and on hummocks bordering fresh water lakes where erosion and slumping is constantly taking place due to wave action and thawing of permanently frozen ground,

*Cochlearia* often grows to the exclusion of other species. The general shape of the plants is to some extent dictated by the microtopography. On flat ground surfaces, whether horizontal or sloping, the more typical rosette form dominates. Plants growing in depressions have an elongation of the main axis and the lateral branches. The fact that *Cochlearia* can grow removed from the ocean is seen by its occurrence on the inland hummocks. In one particular instance it grew profusely on barren lake banks ten miles from the ocean. Another inland habitat is the bare tops of peat hummocks often resulting in pure stands. Associated inland species are primarily *Potentilla emarginata* Pursh, *Draba* spp., *Phippsia algida* (Soland.) R. Br., and *Saxifraga rivularis* L.

Wherever man dwells he alters natural conditions and permits certain species to assume a weed status. This is true in the Arctic as it is in more temperate climates. There are several abandoned Eskimo villages in the vicinity of Point Barrow. These sites have been altered by trampling of the original vegetation cover, by the enrichment of the soil by human and canine excreta, and by the formation of numerous kitchen middens. In the black heavy nitrogenous soil *Cochlearia* has spread rapidly. At the old village site, Nuwuk, at Point Barrow much of the ground is covered by pure stands of *Cochlearia*. The stands are often several meters in diameter and the surface coverage is complete. Elsewhere it grows intermingled with *Cerastium beeringianum* C. & S., *Dupontia fisheri* R. Br., *Poa arctica* R. Br., *Phippsia algida* (Soland.) R. Br., *Saxifraga rivularis* L., and *Stellaria humifusa* Rottb., both on the ground and on the ancient Eskimo sod huts. The typical form of the plants growing in close physical contact with other species is a spindly one with a much elongated central axis and lateral basal branches, up to 15–20 cm. long. Polunin (1948, p. 126) notes a similar occurrence of *Cochlearia officinalis* subspecies around inhabited areas on the Cumberland Peninsula across Davis Strait from Greenland.

Along Elson Lagoon, in the vicinity of Point Barrow, the shore line is constantly being eroded by wave action and the melting of subsurface ice masses, causing large pieces of sod and earth to slump into the Lagoon. *Cochlearia* is often abundant on the newly exposed bare faces and tends to invade the mature tundra above.

*Cochlearia* is probably a biennial plant. The large number of dead plants among the living ones suggests this. Flowering may be delayed until the second year. The season begins shortly after the snow has melted along the coast, usually about the 15th of June and lasts until about the end of September.

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Arctic Research Laboratory (under contract with the Office of Naval Research), Point Barrow, Alaska, and Dudley Herbarium, Stanford University, Stanford, California.

## SUGGESTION FOR THE ASSIGNMENT OF TORREYOCHLOA TO PUCCINELLIA

Robert T. Clausen

On the basis of cytological and morphological data, Church (1949) removed from *Glyceria* the "pauciflora group" of species and proposed for them the new genus *Torreyochloa*. The purpose of the present discussion is to indicate first that the valuable data supplied by Church demonstrate that the species of the "pauciflora group" of *Glyceria* should be transferred to *Puccinellia* and second to validate for use the binomial which is necessary for the eastern North American species which is involved in this consideration.

The separation of *Glyceria* from *Puccinellia* in current manuals and floras is unsatisfactory. In the new eighth edition of Gray's Manual, for example, Fernald (1950), in his key, described the sheaths of *Glyceria* as closed and the lodicules as united. Yet, as species no. 13 under *Glyceria*, he listed *G. pallida* with the lower sheaths free (= open) at the summit, but did not mention the lodicules which are free. Mrs. Chase (1951), in the useful second edition of Hitchcock's Manual, separated *Puccinellia* on a basis of the faint nerves of the flowering glumes and the habitat

in saline soil, but ignored discrepancies pointed out by Church between the "pauciflora group" and the rest of *Glyceria*.

Older authors similarly had trouble in differentiating *Glyceria* and *Puccinellia*. Hackel (1887) separated *Glyceria* from *Puccinellia* (as *Atropis*) on the basis of the evident awns ("Gr. deutlich") and connate lodicules as opposed to the absence of awns and free lodicules in *Puccinellia*. Belk (1939) has shown, however, that the lodicules are free in *Glyceria canadensis* and in some populations of *G. striata*, both species which clearly belong in *Glyceria* on a basis of many other characteristics. Hackel's statement about awns on the flowering glumes of *Glyceria* is perplexing and untrue. Since "Granne" appears elsewhere in his text with the usual meaning, namely awns, the reference to awns in *Glyceria* appears to be a mistake.

Church (1949) reported that *Glyceria pauciflora*, *G. erecta*, *G. pallida* and *G. fernaldii* all have sporophytic numbers of 14 chromosomes, whereas species of *Glyceria* have numbers which are multiples of 10. Because of this cytological difference and certain differences in morphology which are well indicated in his table 2, he rightly concluded that these and four related species should be removed from *Glyceria*. Accordingly, he proposed the new genus *Torreyochloa* for this group of species. Although Fernald (1950) and Chase (1951) had the chance to review the evidence for *Torreyochloa*, both rejected it and continued to include in *Glyceria* the species assigned to it by Church.

The species placed in *Torreyochloa* by Church differ from *Glyceria* in having the leaf—sheaths open, not closed and the second empty glumes with three nerves instead of one. These both are characteristics by which *Puccinellia* likewise differs from *Glyceria*. On the other hand, *Torreyochloa* has in common with *Glyceria* the prominent nerves of the flowering glumes and usually the adjustment to freshwater conditions, although in the Montezuma Marshes of New York *Glyceria pallida* occurs in brackish situations and *Puccinellia distans* grows in this same area. Other morphological characteristics, such as compression of the spikelets, vary too much to be useful for separating genera. On a basis of the morphological differences and similarities of *Glyceria*, *Torreyochloa* and *Puccinellia*, a decision as to relationships might be difficult, since the condition of the sheaths and

nervation of the second empty glumes need to be weighed in importance against the prominence of the nerves of the flowering glumes and the adjustment to habitat. Fortunately, the cytological data of Church indicate how these morphological data should be evaluated. For *Glyceria* he reported sporophytic numbers of 20, 40 and 60; for *Torreyochloa* 14; and for *Puccinellia* 14, 28, 42, 56 and 63. The alignment of *Torreyochloa*, on a basis of number of chromosomes, is with *Puccinellia*. Further, the chromosomes are similar in size, being larger and longer than those of *Glyceria*. The condition of the sheaths, the nervation of the second empty glumes, the branching of the stigmas, the apices of the grains and the chromosome all indicate such a close similarity between *Torreyochloa* and *Puccinellia* that they should not be separated as genera. Instead, *Torreyochloa* should be included in *Puccinellia* as a section, distinguished primarily by the prominent nerves of the flowering glumes. This conclusion requires the following formal changes of nomenclature:

Sectio **Torreyochloa** (Church) stat. nov., fundata super *Torreyochloa* Church, Am. Jour. Bot. **36**: 163 (1949).

**Puccinellia pallida** (Torrey) comb. nov., fundata super *Windsoria pallida* Torrey, Cat. Pl. City N. Y., p. 19, 91 (1819).

Since the taxonomic status of other species assigned by Church to *Torreyochloa* is uncertain, their transfer is best postponed until clear specific differences are established between them and *Puccinellia pallida*. The North American species of this relationship comprise a series and essentially replace each other geographically and altitudinally. They may all belong to a single polytypic species. The names involved include *Glyceria fernaldii* St. John, the doubtful status of which as a species already has been discussed by Fassett (1946); *Glyceria pauciflora* Presl, only slightly different morphologically from *Puccinellia pallida; G. erecta* Hitch., possibly a subalpine and alpine subspecies of *G. pauciflora; G. californica* Beetle and *G. otisii* Hitch., which may be respectively a high altitude dwarf and a lax shade form; and *G. natans* Kom. and *G. viridis* Honda, both of which require further study before their status can be evaluated.

The inclusion of *Torreyochloa* as a section of *Puccinellia* requires redefinition of both *Glyceria* and *Puccinellia*. As reconstituted, the two genera may be separated as follows:

A. Sheathes of leaves usually connate; nerves of upper empty glumes single; styles present; chromosomes small or medium in sets of 10 ..... *Glyceria.*
AA. Sheaths of leaves open; nerves of upper empty glumes 3; styles absent; chromosomes large, in sets of 7 ..... *Puccinellia.*

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## PERLUSTRATIONES PLANTARUM ARCTICARUM II:

### 'Parry Plants' in the Manchester Museum

Nicholas Polunin

Among the most interesting of the many botanical collections given by the late James Cosmo Melvill (1845–1929) to the Manchester Museum were three small sets of Parry plants totalling about 130 specimens which were kindly sent to me for identification at Oxford some years ago by the then Curator of the Museum's herbaria, Miss Grace Wigglesworth, as indicated in 'The Manchester Museum . . . Report for the Year 1941–42,' pp. 6–7. The specimens were mounted on small pieces of drawing paper, generally about 16 cm. long by 9 cm. wide, which had subsequently been stuck on to large herbarium sheets stamped nearby with a letter (A, B or C) to indicate the set to which each specimen belonged. To distinguish the small, original sheets from the large herbarium ones, the former will hereafter be called "sheetlets." Although these sheetlets were of varying texture and color within each set, and usually more than one of them was stuck on each herbarium sheet, the stamped letters or other

considerations enabled the specimens to be dealt with in what it seemed reasonable to presume were their three original sets.

Certainly one or two and probably all three of the sets were given to Mr. Melvill in 1927 by the late Sir Sydney Parry, grandson of the navigator and father of the present Admiral Sir W. E. Parry. As a boy Melvill had evidently met the great arctic navigator; and I have seen a letter, dated March 4, 1927 when Melvill was some years past the *four*-score, in which he thanked Sir Sydney for the gift of plants "collected by your grandfather Sir Edward Parry from Port Bowen chiefly." This must be borne in mind firstly because on a sheet of paper accompanying these collections there are written in Mr. Melvill's hand the following confused and misleading notes " . . . given me by Sir Sydney Parry son of the collector Admiral Sir W. E. Parry . . . contains a few of his Arctic Plants collected on the Franklin Expedn. (search for Sir John Franklin)," and secondly because in "A brief account of the Cosmo Melvill Herbarium" (*Manchester Museum Publication* 54, pp. 5 and 12, 1904) there is mention of "Arctic plants, collected during the Franklin expedition" and "Arctic Europe and America . . . Rutherford (Franklin Expedition)." Some of these notes have been repeated in printed and other records but if there is truth in them they must belong to collections other than the present three sets. These sets will now be described in detail, the order and nomenclature followed in each list of component plants being that of my "Botany of the Canadian Eastern Arctic. Part I,"[1] except that the few mosses are named according to Prof. W. C. Steere's contribution to Part II of the same series.[2] Synonyms will in general be given only where they are necessary for direct reference to a cited paper.

Set A. This first set is labelled, on a sheetlet of the size and texture most used for mounting in all the sets, "Plants Port Bowen 1825 lat. 75° long. 115." Below this is written on the same sheetlet "Elizth. Gurney from Capn. Parry." The latter label is in a hand much resembling Parry's but the former was

[1] Canada: Department of Mines and Resources, *National Museum Bulletin* No. 92, pp. vi + 408, 1940.

[2] Polunin *et al.*: 'Botany of the Canadian Eastern Arctic. Part II, Thallophyta and Bryophyta'; Canada: Department of Mines and Resources, *National Museum Bulletin* No. 97, pp. v + 573, 1947.

evidently written by somebody else—not only because of the very different calligraphy but because the figures given for latitude and longitude are so far out as to suggest that the writer had never been to Port Bowen, or even, probably, on the expedition on which the plants were gathered! This expedition, the first label indicates, was Parry's 'Third Voyage for the Discovery of a North-West Passage,' as is upheld by a further label on a separate piece of paper which reads "Dried Plants brought by Sir Edward Parry from Port Bowen 1825. Presented to Elisabeth Gurney" (*sic*). Port Bowen was the wintering place of the expedition and lies in about lat. 73° N. and long. 89° W. on the west coast of the Brodeur Peninsula, Baffin Island. That the collection was lent by one Samuel Gurney for some months in 1876 to a "Scientific Apparatus Exhibition" in the "South Kensington Museum" is to be gathered from formal correspondence in which it is described as "A collection of 30 specimens of dried plants from the Arctic Regions made by Sir Edward Parry mounted on paper—and title page."

This set indeed appears to consist of 30 specimens, viz. the 28 marked "A" and two others marked "B" but almost certainly by mistake (*see* annotated list of the specimens given below). That the present specimens were not considered by W. J. Hooker when preparing his "Botanical Appendix"[3] to Parry's account of the voyage seems evident from almost such a series of considerations as led to a similar conclusion with regard to another set collected on the same expedition and described in the first paper in this series (hereafter cited as "Perl. I").[4] Nevertheless most, and probably all, of the vascular plant taxa represented in either of these sets are mentioned or at least "covered" by Hooker in his appendix.[3] The plants comprising the set described in Perl. I were satisfactorily localized, having been collected at Port Bowen, or on Somerset Island, or on the Whale-fish Islands off the west coast of Greenland. The plants of the present set are

[3] Pp. 121–131 of the appendix to W. E. Parry, 'Journal of a Third Voyage for the Discovery of a North-West Passage from the Atlantic to the Pacific; performed in the years 1824–25, in His Majesty's Ships Hecla and Fury.' *London:* pp. xxviii + 186, and appendix, pp. 1–151, 1826.

[4] Published in the *Journal of Botany* (vol. 80, pp. 81–94, "May, 1942"), the cessation of publication of which is the reason for the time-lag in the appearance of this and some further papers in the series. In Perl. I the plants described were unfortunately referred to as "the University of Durham set"; they have since been generously presented to me personally by the actual owner, Professor J. W. Heslop Harrison, F.R.S.

given no localities except the general one of Port Bowen which can scarcely be correct in all instances; it seems more likely that of these specimens, again, some (e. g. *Saxifraga flagellaris*) came from Somerset Island and others (e. g. *Loiseleuria procumbens*) from the Whale-fish Islands. In any case there are prevailing doubts which must prevent any additional records from being founded on this set.

The only words written on the sheetlets of set A (with the exception of the one moss, which lacks any note) are attempted binominal identifications. These are mostly, but not all, in the same, apparently contemporary hand which though not characteristic may perhaps be Parry's. The specific names are almost invariably capitalized, and spelling mistakes are common and of a type (e. g. "Oppositafolia" and "Flagellaria" in both the present set A and the one from the same expedition described in Perl. I) which suggests that many at least of the identifications were made, if not by the same person, then either from the same (other?) set or at the same time before distribution. Unlike the earlier described set which is watermarked "1825," consideration of the various papers comprising sheetlets in the present set lends weight to the likelihood of the mounting having been done during periods of inactivity on board ship. This mounting and subsequently the identifying were probably, and the distributing after landing most likely, carried out before Hooker took over the (main?) collections for the preparation of his "Botanical Appendix"; for it seems that from these expeditions it was the custom to bring back collections of "dried flowers" for presentation to one's friends.

There follows an annotated list of all the different plants represented in this set A in which, when a specimen is noted as "Correctly named on sheetlet," errors of spelling or undesirable capitals are ignored:

Pohlia cruda (Hedw.) Lindb. No note on sheetlet. Not included among the three mosses mentioned by Hooker,[3] but earlier recorded from the same general region and now known to occur practically throughout the Canadian Eastern Arctic—cf. Steere.[2]

Cystopteris fragilis (L.) Bernh. Sub nom. *Woodsia*. This species was reported with some doubt from Port Bowen by Hooker[3] (sub syn. *Aspidium fragile*).

Alopecurus alpinus Sm. Correctly named on sheetlet.

Pleuropogon sabinii R. Br. Correctly named on sheetlet. Only very doubtfully reported from Port Bowen—*see* Bot. Can. E. Arctic, I, p. 64—though probably occurring there, even if this specimen may well have come

from elsewhere. Concerning the use of this specific name, see Polunin in Bull. Torr. Bot. Club **71**: 248, 1944.

SALIX ARCTICA Pall., *s. l.* Labelled "Salix Arctica 'The largest tree near the North Pole'." This specimen has peculiarly light-colored, long and narrow bracts rather reminiscent of *S. glauca* var. *stenolepis* (Flod.) Polunin.

POLYGONUM VIVIPARUM L. Correctly named on sheetlet.

LYCHNIS APETALA L. Correctly named on sheetlet.

CERASTIUM ALPINUM L., *s. l.* One of the eight sheetlets of this, although marked "B," is labelled "Cerastium Alpinum" in the same characteristic calligraphy as almost all of set A, to which it presumably belongs.

ARENARIA RUBELLA (Wahlenb.) Sm. Correctly named on sheetlet.

?RANUNCULUS SULPHUREUS Soland. in Phipps. Labelled "Ranunculus Sulphureus" on sheetlet but the determination somewhat uncertain owing to the incompleteness and state of the specimen. *R. sulphureus*, which was included by Hooker[3] in *R. nivalis*, has not yet been authoritatively recorded from Port Bowen but probably occurs there.

PAPAVER RADICATUM Rottb. Labelled on sheetlet "Papaver Nudicaule."

COCHLEARIA OFFICINALIS var. GROENLANDICA (L.) Gelert in Anderss. & Hesselm. Labelled on sheetlet "Cochlearia Fenestrata."

EUTREMA EDWARDSII R. Br. Correctly named on sheetlet.

DRABA ALPINA L. [approaching var. *nana* Hook., emend. Fernald]. Labelled on sheetlet "Draba Alpina."

DRABA FLADNIZENSIS Wulfen, *s. l.* Labelled on sheetlet "Draba Androsacea." Also probably belonging to the present species is an indeterminable scrap labelled on sheetlet "Diapensia Lapponica."

BRAYA PURPURASCENS (R. Br.) Bunge in Ledeb. Labelled on sheetlet "Platypetalum purpurascens" (synonym).

SAXIFRAGA CERNUA L. Correctly named on sheetlet.

SAXIFRAGA CAESPITOSA f. UNIFLORA (R. Br.) Engler & Irmscher. Labelled on sheetlet "Saxifraga Caespitosa"—cf. Hooker.[3]

SAXIFRAGA FOLIOLOSA R. Br. (*S. stellaris* var. *comosa* Retz.) Labelled on sheetlet, but perhaps fairly recently, "Saxifraga congesta?"

SAXIFRAGA NIVALIS L. Correctly named on sheetlet.

SAXIFRAGA FLAGELLARIS Willd. ex Sternb. Correctly named on sheetlet. Not known from Port Bowen or anywhere in Baffin Island but plentiful on Somerset Island ("North Somerset") whence, therefore, the present specimen probably originated (cf. distribution given in Bot. Can. E. Arctic, I, p. 265).

SAXIFRAGA HIRCULUS var. PROPINQUA (R. Br.) Simmons. Labelled on sheetlet "Saxifraga Propinqua" (synonym).

SAXIFRAGA OPPOSITIFOLIA L. Correctly named on sheetlet.

POTENTILLA PULCHELLA R. Br. Correctly named on sheetlet. Not known from Port Bowen, where, however, it seems likely to occur.

DRYAS INTEGRIFOLIA M. Vahl. Originally correctly named on sheetlet.

?PYROLA GRANDIFLORA Rad. Although marked "B," this sheetlet is labelled "Pyrola Rotundifolia" in the same calligraphy as almost all of set A, to which it presumably belongs. The specimen is an indeterminable scrap, probably belonging to *P. grandiflora*, which is not yet known from Port Bowen although quite likely to occur there.

LOISELEURIA PROCUMBENS (L.) Desv. Labelled on sheetlet "Azalea Procumbens" (synonym). Not yet recorded from Port Bowen or anywhere else so far north in the Canadian Eastern Arctic.

PEDICULARIS HIRSUTA L. Labelled on sheetlet "Pedicularis Arctica."

Taraxacum phymatocarpum J. Vahl in Hornem., *s. l.* (*Leontodon palustre* of some early authors). Not yet known from Port Bowen, but its general (and local) distribution suggests that it is very likely to occur there.

Set B. This second set is much the largest of the three. Some of its sheetlets are unmarked, but the majority are clearly labelled in Parry's neat and characteristic hand with both the locality and the year of collection. Other notes on the sheetlets, such as attempted identifications, are entirely lacking, but apparently belonging to this set are two separate sheetlets of the size and texture most often used for mounting throughout. One of these is labelled in the same hand as (and similarly to) the first mentioned under A, except that the latitude and longitude are omitted; the other is labelled in Parry's own hand and reads "Plants from Port Bowen the last wintering place of H. M. Ships Hecla and Fury in the Arctic Regions. 1824–5." But even if the plants were all "brought" (e. g. as "souvenirs") from Port Bowen or the nearby but "far superior" Neill's Harbour, to which the expedition returned before sailing for home, they were not by any means all gathered there; so much is clear from the individual labels on the mounting sheetlets and supported by the identity of some of the specimens themselves. Experience has shown that such individual labels can normally be relied upon, whereas the more general ones of those days often cannot; accordingly it would be unsafe to assume that the unlabelled specimens were collected at Port Bowen, or, once again, to found any records on them.

This set of plants appears to have been retained by Parry and kept in his family until it was given to Mr. Melvill in 1927. Moreover I am inclined to the opinion that, for once, either these specimens or a set of duplicates was seen by Hooker when preparing his "Botanical Appendix"; thus with a very few exceptions the records are all, and correctly, included in this appendix,[3] and the chief of these exceptions, *Papaver* from Port Bowen, is not only easily explained but its omission is rather to be expected (*see* below). The few mosses may well have been ignored by Hooker because they were entirely unlocalized; he was careful in this appendix to give precise localities for all the plants which he included.

?Pohlia cruda (Hedw.) Lindb. Scrap only, without label. Cf. above.

Tomenthypnum nitens (Schreb.) Loeske. Minor portion of a tuft mostly composed of the next species. The sheetlet lacks a label apart from the "B" stamped nearby. Neither this nor the next moss is among the three reported by Hooker in his appendix,[3] but the present species had earlier been recorded from the same general region and is now known to occur practically throughout the Canadian Eastern Arctic—cf. Steere.[2]

Ctenidium procerrimum (Mol.) Broth. No label—*see* above. Although circumboreal, this plant has rarely been collected in the Canadian Eastern Arctic whence it was hitherto known only from rather farther north than Parry reached.

Alopecurus alpinus Sm. Two sheetlets, one labelled "Port Bowen 1825" and the other "Whale-fish Islands[5] 1824"; also a third sheetlet without note or designation which seems most likely to belong here.

Arctagrostis latifolia (R. Br.) Griseb. (*Colpodium latifolium* R. Br.). Port Bowen 1825.

Deschampsia brevifolia R. Br. Port Bowen 1825.

Poa abbreviata R. Br. Lacking locality or date, but superficially resembling the last and so placed with it as to suggest that they had been considered duplicates—perhaps from the time of collection. Already reported by Hooker[3] from "Port Bowen, very abundant."

Poa arctica R. Br. North Somerset[6] 1825.

Salix arctica Pall., *s. l.* Two sheetlets, one labelled "Port Bowen[7] 1825."

Salix glauca L., *s. l.* (cf. *S. cordifolia* Pursh). Whale-fish Islands 1824. Not reported by Hooker (*l. c.*), but probably included by him under some other species. According to M. P. Porsild (*Medd. om. Grønl.*, vol. 58, p. 66, 1920), both *S. glauca* and phases of *S. arctica* are plentiful in this region.

Oxyria digyna (L.) Hill (*O. reniformis* W. J. Hooker). Two sheetlets, one labelled "North Somerset[6] 1825."

Polygonum viviparum L. Two sheetlets, one labelled "Port Bowen 1825."

Lychnis apetala L. Three sheetlets, two being labelled "Port Bowen 1825."

Cerastium alpinum L., *s. l.* Five sheetlets, including two labelled "Port Bowen 1825" and two labelled "Whale-fish Islands 1824."

Stellaria longipes Goldie (*S. edwardsii* of authors). North Somerset 1825.

Arenaria rubella (Wahlenb.) Sm. Two sheetlets, one labelled "North Somerset 1825."

Ranunculus nivalis L. Cape Warrender[8] 1824. There is a duplicate specimen in Herb. Edinburgh (*see* Bot. Can. E. Arctic, I, p. 216, footnote 1).

Ranunculus sulphureus Soland. in Phipps. North Somerset 1825. Included by Hooker[3] in *R. nivalis*, which is noted as "North Somerset, very abundant" (but *see* Perl. I).

Papaver radicatum Rottb. (*P. nudicaule* of some authors, not L.). Two sheetlets, both labelled "Port Bowen 1825." Recorded by Hooker[3] only from "North Somerset," but this does not necessarily mean that he did not see the

[5] C. 69° N. off the coast of West Greenland. Visited on the outward voyage.

[6] Now called Somerset Island.

[7] Any residual sheetlet which is not mentioned as labelled may be understood to be unlabelled.

[8] Lat. 74° 26′ N. and long. 81° 44′ W. on Devon Island (previously called "North Devon").

present specimens, as (1) there are similarly labelled duplicates of the present specimens in both the British Museum and Kew herbaria, and (2) this very common plant is the only one implied specifically—as only one species of "poppy" is known from the region—by Parry in his narrative of his 'first' voyage[9] as having been seen not far from Port Bowen already in 1819—cf. also Hooker's introductory remarks to his appendix[3] in which he explains that "this list has been reduced to as small a compass as possible, there being but few plants which had not been found during the previous voyages."

Cochlearia officinalis L., *s. l.*, vars. (*C. fenestrata* of authors). Two rather doubtful sheetlets belonging to this difficult polymorph: one, labelled "North Somerset 1825," is referable to var. *oblongifolia* (DC.) Gelert in Anderss. & Hesselm., which has not hitherto been reported from Somerset Island but may be a mere *forma crassa* of the better marked var. *groenlandica* (L.) Gelert in Anderss. & Hesselm., to which the other specimen, that is unlabelled, probably belongs. However, it is atypical in being upright and leafy, though small, and in having subspherical siliques.

Eutrema edwardsii R. Br. Three sheetlets, two of them labelled "Port Bowen 1825."

Cardamine bellidifolia L. Mere scrap without label.

Draba alpina L. [approaching var. *nana* Hook., emend. Fernald]. Two sheetlets, one labelled "Port Bowen" (without date).

Draba fladnizensis Wulfen, *s. l.* (*D. hirta* var. of some authors). Two sheetlets, both labelled "Port Bowen 1825."

Braya purpurascens (R. Br.) Bunge in Ledeb. (*Platypetalum purpurascens* R. Br., *Braya arctica* Hook.). Two sheetlets: the one labelled "Port Bowen 1825" is a mere scrap insufficient for certain determination but appears to belong to var. *dubia* (R. Br.) O. E. Schulz, as the only silique remaining is short and pilose. This scrap would seem to have been too small for Hooker, if indeed he saw the present specimens before publishing his 'Botanical Appendix', as he says,[3] "Of my supposed *Braya arctica*, there were only specimens in flower in the collection, and these flowers were scarcely fully developed."

Saxifraga rivularis L. Whale-fish Islands 1824.

Saxifraga cernua L. Three sheetlets, two of them labelled "Port Bowen 1825."

Saxifraga caespitosa f. uniflora (R. Br.) Engler & Irmscher. Three sheetlets, one atypical and the others labelled "Port Bowen 1825"—cf. Hooker.[3]

Saxifraga foliolosa R. Br. (*S. stellaris* var. *comosa* Retz.). No locality or other note.

Saxifraga nivalis L. Two sheetlets, one labelled "Port Bowen 1825."

Saxifraga flagellaris Willd. ex Sternb. Two sheetlets, one labelled "North Somerset 1825."

Saxifraga hirculus var. propinqua (R. Br.) Simmons. Three sheetlets, including one labelled "Port Bowen 1825" and another labelled "North Somerset 1825"—cf. Hooker.[3]

Saxifraga oppositifolia L. Three sheetlets, two of them labelled "Port Bowen 1825."

Potentilla pulchella R. Br. Two sheetlets, one without any note and the other labelled "North Somerset 1825," whence the species was already

[9] W. E. Parry, "Journal of a Voyage for the Discovery of a North-West Passage from the Atlantic to the Pacific; performed in the years 1819–20, in His Majesty's Ships Hecla and Griper." *London:* pp. xxix + 310, and appendix, 1821.

reported by Hooker.[3] This latter is rather a doubtful specimen which has unusually large cauline leaves and relatively sparse indumentum but is insufficient for description if new.

Dryas integrifolia M. Vahl. Three sheetlets, two being labelled "Port Bowen 1825" and one of these approaching f. *intermedia* (Nathorst) Polunin.

Empetrum nigrum var. hermaphroditum (Lange) Soerensen. Whale-fish Islands 1824—cf. Hooker.[3]

Loiseleuria procumbens (L.) Desv. (*Azalea procumbens* L.). Whale-fish Islands 1824.

Vaccinium uliginosum var. alpinum Bigel. Whale-fish Islands 1824—cf. Hooker, *l. c.* p. 126.

Pedicularis hirsuta L. Three sheetlets, two of them labelled "Port Bowen 1825."

?Antennaria angustata Greene (*A. alpina* of authors, not L.). Whale-fish Islands 1824. Not quite typical.

Chrysanthemum integrifolium Richardson. North Somerset 1825.

Set C. This is the last and smallest of the sets under consideration here. It consists of 27 sheetlets, representing 20 species of angiosperms (*see* list below), and seems to be something of a 'rubbish heap.' Thus on a small paper label stuck to a wooden board which accompanied the specimens when they reached Manchester is written—apparently by Parry, and ending with his signature—"Specimens of Plants collected in the Polar Regions A. D. 1819–20 by W. Parry." According to this the specimens should have been collected during Parry's 'first' voyage, probably (but not necessarily—*see* Perl. I) on Melville Island. This is indeed upheld by three of the four labels occurring on the individual sheetlets (the majority are unmarked), but significantly enough not by the fourth such label, which reads "Luzula Hyperborea Igloolik" and indicates that this and perhaps some of the other specimens were collected during Parry's "second" voyage (1821–23). In this connection it is significant to note that four of the species in this set are unrepresented in Robert Brown's "Chloris Melvilliana,"[10] although two of these are now known to grow on Melville Island and the other two seem not unlikely to occur there. Thus, once again, it is evident that we must not allow any new records to be founded on the unlabelled specimens in this collection, while the four specimens that are labelled and localized (*see* below) merely substantiate old reports:

[10] 'A list of plants, collected in Melville Island, by the officers of the expedition; with characters and descriptions of the new species': pp. cclxi–cccx of the 'Supplement to the Appendix of Captain Parry's Voyage for the Discovery of a North-West Passage, in the years 1819–20'. *London:* pp. clxxxi–cccx, 1824.

Poa arctica R. Br. Two sheetlets.

Luzula nivalis (Laest.) Beurl. (*L. hyperborea* R. Br., in part). Labelled "Luzula Hyperborea Igloolik": there is a similar specimen in Herb. Copenhagen.

?Salix polaris Wahlenb. An interesting but problematical specimen: leaves entire to subentire, somewhat hairy like the young twigs; bracts dark brown and rounded, broad, hairy; capsule densely white-tomentose—characters that, although they strongly suggest the variable *S. polaris*, of which I have collected similar forms in Spitzbergen and on mountains in the extreme north of Scandinavia, still do not exclude phases of the even more variable *S. arctica* (cf. H. G. Simmons, 'A Survey of the Phytogeography of the Arctic American Archipelago,' p. 73, 1913) or some hybrids of *S. herbacea*. It would not be altogether inaccordant with the known range of *Salix polaris* that it should occur on Melville Island, which has distinct "western" relationships phytogeographically and lies only a few hundred miles east of areas whence plants that have been authoritatively referred to it have been reported (e. g. by Simmons, *l. c.*); again, a few hundred miles to the east in the Lancaster Sound region *Salix herbacea* is not rare (*see* Bot. Can. E. Arctic, I, p. 156), though I have searched in vain for its hybrids hereabouts. But in any case the locality of the present specimen is doubtful and no new record can be founded on it, although both *S. polaris* and *S. herbacea* should be searched for on Melville Island. Actually, the representative of *S. polaris* to be expected on Melville Island should any occur there, is subsp. *pseudopolaris* (Flod.) Hultén, Fl. Alaska and Yukon, III, p. 510, 1943, which is stated by Hultén (*l. c.*) to constitute "a not too distinct geographical race of *S. polaris*, characterized by light-coloured bracts with wavy hairs."

Polygonum viviparum L.

Cerastium alpinum L., *s. l.* Two sheetlets, one labelled "Cerastium Alpinum Melville Island North Georgia."

Stellaria humifusa Rottb. Two sheetlets, unfortunately unlabelled. Not yet recorded from Melville Island but probably occurring there; circumpolar but of diminutive stature and restricted (saline) habitat, hence generally overlooked.

Ranunculus sulphureus Soland. in Phipps (*Ranunculus nivalis* var. of some authors). Two sheetlets.

Papaver radicatum Rottb. (*P. nudicaule* of some authors, not L.). Labelled "Papaver Nudicaule Melville Island North Georgia."

?Draba alpina L., *s. l.* Atypical but inadequate scrap.

Braya purpurascens (R. Br.) Bunge in Ledeb. (*Platypetalum purpurascens* R. Br.).

Saxifraga rivularis L. (*S. hyperborea* R. Br.).

Saxifraga cernua L.

Saxifraga caespitosa f. uniflora (R. Br.) Engler & Irmscher (*S. uniflora* R. Br.).

Saxifraga foliolosa R. Br. Two sheetlets.

Saxifraga nivalis L. Two sheetlets, of which one is apparently normal and the other represents a peculiar form rather reminiscent of, and possibly resulting from hybridization with, *S. hieracifolia* Waldst. & Kit.

Saxifraga tenuis (Wahlenb.) H. Smith (*S. nivalis* var. *tenuis* Wahlenb., *S. nivalis* var. "β. corymbus simplicissimus pauciflorus" R. Br.).

Saxifraga flagellaris Willd. ex Sternb.

POTENTILLA HYPARCTICA Malte (*P. emarginata* var. *typica* Abrom.). Not mentioned by Brown,[10] but the species is now known to occur on Melville Island—*see* Simmons, *op. cit.* p. 108.

CASSIOPE TETRAGONA (L.) D. Don (*Andromeda tetragona* L.). Two sheetlets, one labelled "Andromeda Tetragona Melville Island North Georgia."

PEDICULARIS HIRSUTA L. Not reported by Brown[10], but now known to occur on Melville Island—*see* Simmons, *op. cit.* p. 124.

In conclusion it is a pleasure to acknowledge indebtedness to Mr. Strickland Gibson, lately Keeper of the University Archives, Oxford, for advice and assistance with the identification of handwriting, and to thank my colleague Dr. A. R. Clapham for so kindly determining the mosses mentioned in this contribution. Grateful acknowledgment is also due to the John Simon Guggenheim Memorial Foundation for their generosity in granting a research fellowship and to Harvard University for once again affording facilities and an honorary appointment for the continuation of my multifarious works in arctic botany.—GRAY HERBARIUM.

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THE PROPAGATION OF THE CAMPERDOWN ELM.—My recent encounter with Fernald's[1] rather irritated comment on carelessness in books on trees leads me to recount an instance of a statement in an otherwise useful and dependable book on trees. In this book the statement is made that the common Camperdown Elm is propagated by a reverse graft. I do not know what a *reverse* graft may be but suppose it to be one in which the top of the scion points downward.

I have never grafted any Camperdown elms, but I have seen such grafts shortly after they had been made and found the scions were upright. I have been assured by plant propagators, superintendents of arboreta and foremen of extensive nurseries that the Camperdown elm is always grafted with the scion in the normal upright position. The Camperdown elm, like the weeping mulberry, is so strongly recumbent that it must be "worked" on a standard to prevent its creeping on the ground. In fact, I have one which was grafted near the ground level that is being used as a ground cover.

I had long ago heard the folk tale of the upside-down grafting to propagate weeping trees but supposed it had passed out of

[1] Fernald, M. L. "Why so many careless books on trees and other plants?" *Rhodora:* 52: 272–279, 1950.

circulation with increased knowledge of the development of cultivated types of trees. But, not long since I heard one of our teaching fellows telling a class in elementary botany this strange tale of *reverse* grafting. When I undertook to correct him, he said they were all told this story by the professor in charge of the course. The professor, when challenged, said he believed he had read it in a book by L. H. Bailey. Unwilling to believe such a thing of a man so eminent as a plant propagator[2] I searched all the works of Bailey which I thought might possibly contain such a statement without finding any incriminatory evidence. After I had alternately searched and fumed for some time, one of my students discovered for me the true source of the statement. I shall not cite the title of the tree book in question since the book is useful and generally dependable and the offending statement is made only in a revision, and may not have been from the hand of the author himself.

I now await the appearance of that other strange idea of weeping trees; that they are produced by planting normal trees of certain species upside down with the roots in the air.—CARL D. LARUE, DEPARTMENT OF BOTANY, UNIVERSITY OF MICHIGAN, ANN ARBOR, MICHIGAN.

[2] Bailey, L. H. *The Nursery Book*, xi + 395, 20th ed., MacMillan, New York, 1915.

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